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Descriptors-Classroom Communication, *Elementary School Science, *Elementary School Teachers, Interaction Process Analysis, *Teacher Behavior, *Teacher Characteristics, *Teacher Education, Teacher Evaluation, Teaching Methods

Identifiers-Science Curriculum Assessment System

Reviewed are studies which have described classroom behavior by direct observation using various category systems. Described in detail is the Science Curriculum Assessment System for classroom interaction analysis. This is designed to monitor classroom conditions associated with elementary school science instruction. The system combines the interview techniques and theories of Jean Piaget with those of interaction analysis in order to study the intellectual development of children, classroom behaviors of teachers and pupils, and the various elements of the science curriculum. (GR)

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Dallas, Texas
Friday, March 21, 1969

AETS - NSSA Joint Concurrent Sessions:
Education, Practice, and Supervision
in Science Teaching

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Session C
2:15 PM to
3:30 PM
Fiesta Room
Baker Hotel

Instruments for Teacher Assessment

Presiding: *Harleen W. McAda*, Assistant Professor of Education, University of California at Santa Barbara

Speaker: *Charles C. Matthews*, Director, Child-Structured Learning in Science and Assistant Professor of Science Education, Florida State University, Tallahassee

Reactants:

Robert W. Johnson, Instructor, Science Education, Wayne State University, Detroit, Michigan

David S. Sarner, Associate Professor, Elementary Education, City College of New York, New York

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The speaker's presentation involved several remarks related to the attached paper (which was distributed at the session).

Filmed segments of elementary school science "lessons" were used to illustrate assessment of teachers in terms of (1) generalized observations using a "rating scale,"(2) achievement of children on performance criteria established in advance by the teacher and/or the curriculum developer, and (3) the logical consistency between teacher and pupil classroom behaviors and the long-term goals of science education as stated by the teacher or curriculum developer.

Assessment by means of "generalized observations" in which rating scales are used were dismissed by the speaker as unreliable and of extremely limited value.

Assessment by means of pre-established performance criteria (student behavioral outcomes) was criticized by the speaker as inappropriate for the following reasons: (1) It assumes sufficient knowledge of the child's cognitive level to decide what makes sense to him and what does not. Behavioral expectations which are beyond the mental operations available to the child could result in learning by imitation alone. The speaker asserted that "Mimicry is appropriate for <u>training</u> but <u>not</u> for early <u>educational</u> experiences in science." He stated, "We cannot at present rely on our feeble ability to recognize the difference between mere imitation and internalized learning" in which appropriate mental operations are associated with the observed physical manipulations (behavioral outcomes).

The speakers position on the assessment of science teachers (at the elementary school level) was admittedly controversial. To illustrate his position he described a hypathetical teacher who accepted the following as her "long-term goals" in science teacher. As a result of science education the learner will be

able to:

1. structure problems which are compatible with the problem-solving mental operations available to him,
2. recognize that knowledge is man-made and changing,
3. reject the irrational and accept that which is rational (or at least distinquish between the two), and will
4. look to his physical environment for evidence of "accuracy" or "satisfactoriness" of his own ideas (self-made knowledge rather than looking exclusively to "authorities").

Assessment of this person as a teacher involves, then, observing and recording selected elements of the teacher's classroom behavior and subsequently (and separately) making a value judgment as to the logical relatedness between the teacher's goals and her classroom behavior (the objective data collection is a separate operation from the value judgment).

The Science Curriculum Assessment System is one system available for quantitatively describing this teacher's behaviors and providing her with the feed-back necessary for self-evaluation. External evaluation can now be based on objectively-collected data.

The "SCAS Classroom Interaction Categories" focus on teacher and pupil behaviors associated with the classroom conditions which this hypothetical teacher desires to establish.

Instruments for Teacher Assessment

Distributed as part of a presentation at a joint session of the

Association for the Education of Teachers of Science

and the

National Association of Supervisors of Science

March 21, 1969

Dallas, Texas

by

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I. Introduction

Whether one is assessing teachers, pupils, or a science program, it is important to collect information from teachers and children in the natural environment of teaching and learning. It is inconceivable that any program or teacher should be evaluated in the absence of systematic and objective classroom data collection. However, systematic collection of data in the classroom has been slow in coming. It is apparent that classroom data collection involving evaluation of teaching has a much longer history than data collection involving systematic assessment of teaching.

The early period through the 1920's and 1930's saw the use of rating scales in most research involving direct observation of teachers. Research results in which rating scales were used are viewed by Medley and Mitzel (1,2) as providing "uniformly negative results" due to lack of uniformity in evaluative criteria. Ventilation, lighting, color schemes and other relatively obvious classroom variables frequently dominated evaluation in which rating scales were used.

With the pioneer work of Moreno (3) and the subsequent efforts of Jennings (4, 5) the promise of the sociometric approach focused classroom research on the student rather than the teacher. A concurrent development was a trend toward specifying and quantifying only selected aspects of the teacher's classroom behavior. This technique is much in evidence in current research and involves observation and categorization of classroom behaviors. The work of Johnson (6) and the subsequent work of Anderson (7, 8) represent further landmarks in developing categories for quantitatively describing teachers' verbal behaviors in classrooms.

Lippitt (9) and Withall(10) suggested that the main direction of influence in the classroom is from teacher to learners. Although this viewpoint has been modified somewhat by Gold (11) and Thelen (12), research emphasis has focused primarily on the teacher-pupil observable verbal communication.

The area of classroom behavior receiving most emphasis in direct observation research, and the area in which observation has been applied most successfully, is that referred to as "classroom climate" (2). Flanders (13) is responsible for the development and research use of what appears to be a useful technique for observing classroom climate. This system assumes verbal interaction between the teacher and pupils to be an adequate sample of teacher classroom behavior and has successfully distinguished among various "classroom climates." It is unique in preserving information regarding the sequence of verbal behavioral categories as well as the frequency and amount of time devoted to each catetory. The dimension of verbal interaction to which the Flanders System is directed has to do with "directness of teacher influence."

Medley and Mitzel (2) summarized several sets of verbal interaction categories and systems of analysis. They suggested that the classroom behavioral dimension which is called "classroom climate" has been investigated successfully under various names in different projects. Such terms as dominative-integrative, teacher-centered versus learner-centered, hostile-supportive, direct-indirect

influence and others are said to be highly similar (or even identical) dimensions of behavior, which are reliably measurable and important in the development of educational theory. The summary further asserts that verbal behavior has been measured more successfully than any other dimension of classroom behavior.

A recent investigation of the classroom verbal behavior of high school physics teachers by Snider (14) identified relationships between teacher-pupil verbal interaction and "effectiveness" in teaching high school physics.

In recent years interaction analysis has been used as a tool in studying the student teaching experience. One such study reported by Wilk and Edson (15) indicated that in the lower grades student teachers are more likely to exert "direct influence" on pupils and in the upper elementary school grades the student teachers are more likely to exert "indirect influence." Matthews (16) and McLeod (17) have used Flander's categories to determine some verbal behaviors in which the cooperating teacher exerts an influence on the behavior of the student teacher.

Smith (18) advocated and effected a shift in emphasis from the affective to the cognitive aspects of classroom behavior. Others (19, 20, 21, 22) followed his lead. The work of Smith, Meaux and their associates (21) has produced a detailed classification system consisting of thirty-five categories of "logical operations of teaching." These "logical operations" include designing, designating, classifying, and others. Aschner (19) and Gallager (20) adapted Guilford's "structure of intellect" model (23) and focused on the verbal responses of gifted students to infer and classify thought processes. The five major categories included are cognitive-memory, convergent thinking-divergent thinking, evaluative thinking, and "routine." Bellack (22) classified classroom discourse into what he refers to as "pedagogical moves" (which he identifies as soliciting, structuring, responding, and reacting). Bellack's group also simplified Smith's thirty-five categories of logical operations by collapsing them to seven. It is unfortunate that the group of classroom interaction analysts who have focused on the cognitive aspects of classroom behavior have not taken full advantage of the tremendous power of matrix analysis. It is obvious that most attention has been given to teacher behaviors in the classroom and relatively little attention has been given to detailed analysis of the influence of teacher behaviors on the behaviors of children. Even less attention has been devoted to examination of the influence of child behaviors on behaviors of the teachers.

Taba (24) has analyzed typescripts which were prepared from tape recordings of elementary school teaching sessions. She found the number of pupils participating in class discussions ranged from 33% in one class to 100% in another. Her data also showed that pupils who produced the most "thought units" also produced the most "higher levels" of thought.

More recently Parakh (25) has developed a set of sixteen major categories (with twenty-eight sub-categories and a "residual" category) which are designed to describe the classroom behaviors of high school biology teachers. The Flander's System of Analysis was applied to these categories and a 16-by-16 matrix was computed to describe teacher-pupil interaction. Studying ten biology teachers in central New York, Parakh found that about 75% of biology "lecture" was devoted to teacher talk, while teacher talk consumed about 50% of the time in

"laboratory sessions." Teachers exhibited non-verbal behaviors about 10% of the total time in "lectures" but almost 40% of the time in "laboratory sessions."

From the research described above it seems obvious that no general theory of classroom behavior has yet been formulated. Medley and Mitzel (2) state that a theory of classroom behavior depends upon: (1) developing methods of quantifying classroom behaviors and (2) collecting a large body of measurements of behaviors using these methods. The means of quantifying classroom behaviors have been developed and are being used as indicated above. However, that the "large body of measurements of behavior using these methods" has not been assembled is emphasized by Cogan (26), who states that "we do not have adequate data for the analysis of the behavior of the teacher."

Although the research of Flanders (27, 28, 29, 30, 31) has made a rather impressive case for the assumption that the verbal behavior of the teacher is an adequate sample of his total behavior, Parakh (25) has questioned this assumption particularly as it relates to science teaching. It is obvious that, if one is to study activity-oriented science teaching, the assumption that verbal behavior is an adequate sample of classroom interaction must be seriously questioned.

If one accepts the view that teaching is a special case of social interaction directed primiarily toward the achievement of selected educational objectives, then it becomes important to identify the individual in the classroom who plays the dominant role in influencing behaviors of others. It is obvious that in classrooms the teacher influences (to the point of dictating) the kind of interactions which take place. The teacher exercises control over the information which he presents, the activities in which students engage, and the manner in which students engage in the activities. The teacher decides whether he will ask questions, give information, give specific directions, observe students, or respond to students. If the teacher decides to respond to student behaviors it is his decision as to how he will respond to students -- with acceptance or encouragement, with suggestions of alternatives, with rejection or discouragement or with severe reprimands intended to immediately terminate certain student behaviors.

Even though it is frequently the teacher who is the major determinant of pupil classroom behaviors, it is obvious to the experienced classroom observer that a great variety of pupil behaviors are exhibited -- frequently even by one child. However, if one systematically and objectively focuses his attention on different children in the classroom, it becomes obvious that a wider range of pupil behavioral patterns may be identified and that these patterns vary from one child to another. Some children exhibit primarily behaviors associated with careful attention to teachers and meticulous application to the teachers' directions. Other children predominantly do not follow specific directions of the teacher but devise their own manner of engaging in classroom activities. Some children frequently initiate interaction with the teacher while other children are more likely to initiate interaction with fellow students. Some students are receivers of ideas both from the teacher and from other children while other children predominantly are givers of ideas to other children and to the teacher. Some children are copiers of the behaviors of fellow students as well as copiers of certain behaviors of their teacher. Some student behaviors are related to the "lesson" and others are more "social."

II. Classroom Observation Instruments

The person who has worked in the area of classroom interaction analysis is well aware that a description of instruments available for teacher assessment would require more space than is practical in a paper such as this. Even a bibliography would occupy more pages than is practiced for distribution here.

For the person who is interested in examining a number of classroom observation instruments, I suggest Mirrors for Behavior, edited by Anita Simon and E. Gil Boyer and published in cooperation with Research for Better Schools, Inc.

Mirrors for Behavior includes a description of more than two dozen observation systems focusing on various elements of the classroom environment. These instruments have been used for research, for teacher training, and for supervision. These uses are described in the publication and approximately 300 bibliographic entries will guide the reader to more detailed information on the use of the systems.

Perhaps it will be useful here to describe only one classroom interaction system which was designed specifically for use in assessing science teaching.

III. SCAS Classroom Interaction System

The Science Curriculum Assessment System (32) is a system for monitoring conditions associated with elementary school science instruction. SCAS combines the interview techniques and theories of Jean Piaget with the techniques of classroom interaction analysis. SCAS provides a system for studying the intellectual development of children, classroom behaviors of children and their teachers, and various elements of the science curriculum.

Since this paper focuses on teacher assessment we shall examine the elements of SCAS that deal with classroom observation. Although there are several variations on how the SCAS Classroom Interaction System can be applied, the details of the application are not given here.

A. SCAS Classroom Interaction Categories.

SCAS Classroom Interaction Categories involve classification of classroom behaviors into two major groups: teacher behaviors and student behaviors. Since teacher behaviors and student behaviors are not independent, the application of the SCAS observational techniques preserves the inter-relatedness of teacher behaviors and student behaviors.

The page after next shows that classroom behaviors fall into the groups: "student behaviors" and "teacher behaviors." Student behaviors are groups into: (1) those behaviors which are related to the lesson (L) and (2) those student behaviors which are not related to the lesson (N). Teacher behaviors are grouped

into: (1) teacher behaviors which involve teacher interactions with less than seven children (S) or (2) teacher interactions with more than six children (T).

Within the two sub-categories of student behaviors, the SCAS Clas room Interaction Categories include ten behaviors (p. 7). The SCAS Classroom Interaction Categories for teacher behaviors also breaks each sub-group into ten specific teacher behaviors (p. 8). Notice that one of the ten categories in each sub-group of teacher behaviors and student behaviors is reserved for non-codable or non-classifiable behaviors.

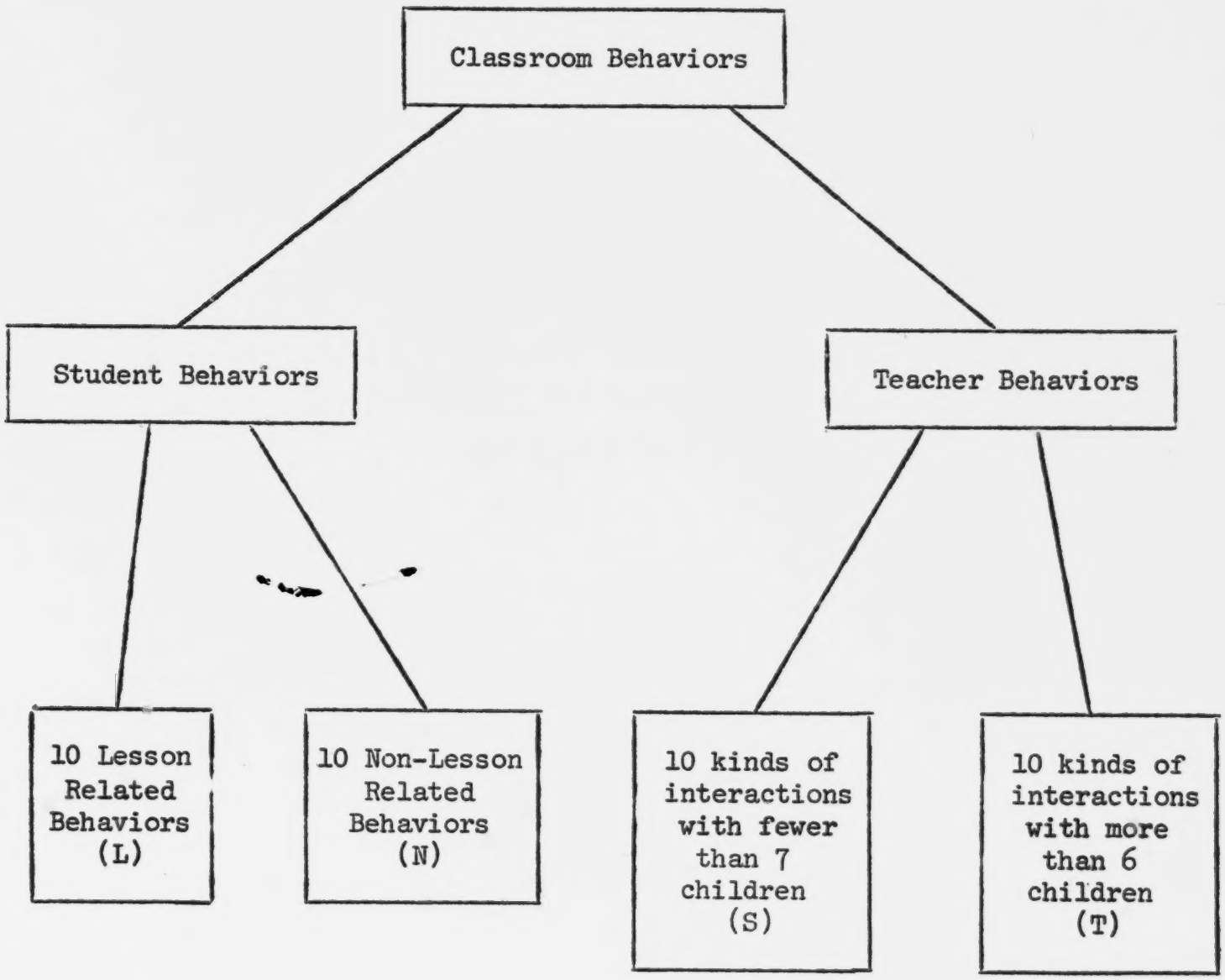
1. Student Behaviors

Page 7 gives an outline of SCAS Classroom Interaction Categories for Student Behaviors. On this set of categories, any classroom student behavior can be identified by a two-place code. The observer of student behaviors must make two decisions in order to code an interval of student behaviors. He must decide:

1. Is the student behavior "lesson related" (L) or "non-lesson related" (N)? "No decision" is coded by "0".

2. Within the sub-group, what is the student behavior (1-9)? "0" again means "no decision."

SCAS Classification of Classroom Behaviors


Classroom Behaviors
Student Behaviors
Teacher Behaviors
10 Lesson Related Behaviors (L)
10 Non-Lesson Related Behaviors (N)
10 kinds of interactions with fewer than 7 children (S)
10 kinds of interactions with more than 6 children (T)

SCAS Classroom Interaction Categories - Student Behaviors

Lesson Related (L)		Non-Lesson Related (N)
L0	miscellaneous	N0
L1	observes teacher or student who demonstrates for teacher	N1
L2	follows teacher's directions (or suggestions) as to <u>how</u> the activity should be done	N2
L3	does not follow any specific teacher direction regarding <u>how</u> an activity should be done	N3
L4	responds to teacher question or request (by telling or showing)	N4
L5	initiates (or attempts to initiate) interaction with teacher; continues self-initiated interaction with teacher	N5
L6	initiates interaction with another student	N6
L7	receives ideas from another student (who is not demonstrating for teacher)	N7
L8	copies other student (or follows instructions of other student); must be preceded by "7"	N8
L9	gives ideas to another student (not at the request of teacher)	N9

SCAS Classroom Interaction Categories - Teacher Behaviors

Interacts with Sub-group - less than 7 children (S)		Interacts with total group - more than 6 children (T)
S0	miscellaneous	T0
S1	does not observe student behavior	T1
S2	observes student behavior but does not respond	T2
S3	accepts and/or encourages student behavior	T3
S4	suggests alternative to student behavior	T4
S5	rejects and/or discourages student behavior	T5
S6	reprimands student for behavior; "unpleasant" criticism; ridicule; sarcasm	T6
S7	asks questions (not rhetorical)	T7
S8	gives information to students; tells <u>what</u> activity should be done; asks rhetorical question	T8
S9	gives directions or information which tells <u>how</u> an activity should be done (more restrictive than "8")	T9

L-N Distinctions

"Lesson related" behaviors include those student behaviors which are associated with what the observer perceives as the science lesson. "Lesson related" student behaviors include reading books or looking at pictures, viewing television, examining objects, moving objects from one place to another. Almost any behavior may be considered "lesson related" if it facilitates the child's participation in the lesson.

Student behaviors which are "non-lesson related" include all behaviors which do not facilitate the student's participation in activities associated with the lesson. This includes reading a book which is not related to the lesson, observing a behavior of a fellow student, staring out the window, falling asleep, etc. If a student stands to look out a classroom window because he has heard a noise, this act of standing and looking out the window is a "non-lesson related" behavior. However, if the student stands to look out a window during the lesson that has to do with characteristics of trees on the playground, the observer must decide if the student is observing trees on the playground. If so, then this behavior falls into "lesson related" behaviors.

Perhaps some examples of "lesson related" versus "non-lesson related" behaviors are in order. Suppose the science lesson involves shadows and children are coming to the front of the room to make shadows on a screen. At the teacher's suggestion all children come forward in order to see shadows which are being made by one or two children. A student who stands and moves forward in the classroom and then observes the screen where the shadows are being made is exhibiting a "lesson related" behavior; his act of standing and walking forward in the classroom facilitates his participation in the lesson. However, a student who during this activity stands and walks around the room touching objects, jumping, sitting on a table, etc., is engaging in "non-lesson related" behavior. The initial behaviors of these two children are quite similar; they both stood and walked, but their behaviors are coded differently; one coded "L" and the other "N".

Imagine a classroom "session" which involves children selecting objects which are arranged on their table. One part of the lesson involves selecting objects with the eyes closed. Students are to pick up a circle without opening their eyes. The student who closes his eyes during this activity is engaging in "L" behavior. However, during a lesson that involves identifying color of an object which is held up by the teacher, the child who dozes with eyes closed is engaging in "N" behavior. The act of closing one's eyes might (during the same lesson) fall at one time into "lesson related" behaviors and at another time into "non-lesson related" behavior.

It should be apparent that in order to classify student behaviors, it is necessary that the observer be aware of the nature of the lesson and the role of student activities in the lesson.

Category 1. This includes children watching or listening to teachers. It might also include the behavior of watching or listening to another student if that student is assisting the teacher or demonstrating for the teacher. Teachers frequently devote a great deal of classroom time to talking to children. Children who are listening to the teacher are exhibiting "Category 1" behaviors. In this case, the distinction between "lesson related" behavior and "non-lesson related" behavior depends upon what the teacher is doing. If the teacher is talking about whether the child had breakfast or not during a lesson that has to do with classifying shells, the child who listens is exhibiting "N1" behavior. However, if the teacher is talking about different properties of shells, showing how shells might be classified, or suggesting that children remove shells from a box in the classroom, the child who is listening to the teacher is exhibiting "L1" behavior. If the teacher asks one child to come forward and pick up two shells that are alike, the child who watches this student is exhibiting "L1" behavior.

Category 2. This category includes behaviors associated with doing what the teacher has suggested (or told the child to do) in the manner in which the teacher indicated that it should be done. This requires that the teacher have given some information which limits the child's activity; telling him how the activity should be done. For example, the teacher has given the children some objects to be classified and has called the child's attention to the observation that some of the objects are red and some are blue. The child who classifies these objects into two groups (red objects in one and blue objects in another) is exhibiting an "L2" behavior. If the teacher has requested that all bus students raise their hands, the child who raises his hand is exhibiting an "N2" behavior.

Category 3. The child who exhibits behaviors which fall into Category 3 is not following any specific directions of the teacher regarding how an activity should be done. The child might be following teacher instructions regarding which activity to do, but he is following his own ideas regarding how the activity should be accomplished. The teacher who suggests that the child place objects in groups has given the child some information regarding the lesson but has not given the child specific directions as to how the objects should be grouped. The child who places a set of objects into groups by color and then classifies the same objects by shape has exhibited "L3" behaviors. The child who removes these objects from their container, rolls them into small "wads", and throws them out the window is probably exhibiting N3 behaviors (if we assume that the teacher did not direct the child to participate in the activity in this way).

Category 4. These include both verbal and non-verbal responses to teacher questions or requests. If the teacher asks a question which is related to the lesson and the child responds by verbally giving her information or by showing her something which he has done, his behaviors in both instances is L4. The child who responds to a teacher question which is not related to the lesson is exhibiting an N4 behavior.

Category 5. This category includes the initiation of any kind of interaction with the teacher, any attempt to initiate interaction with the teacher, and also the continuation of self-initiated interaction with the teacher. The child who raises his hand in an effort to gain the teacher's attention will be exhibiting either "L5" or "N5" behavior - depending upon the kind of interaction which he is attempting to initiate. If this child interacts verbally with the teacher his behavior continues in Category 5 for as long as he is telling or showing the teacher. If the child subsequently listens to the teacher or observes the teacher, his behavior falls into Category 1. Thus, "interaction" in Category 5 does not include observation (listening or watching).

Category 6. This includes verbal or non-verbal initiation of interaction with any student. The student who asks a fellow student a question about a lesson related activity or gives a fellow student information regarding a lesson related activity might be exhibiting in both instances "L6" behaviors. The student who pulls a girl's pigtail or pushes his neighbor is probably exhibiting N6 behaviors. This is also the case if he talks with a fellow student about non-lesson related topics.

Category 7. Receiving ideas or information from another student falls into this category. This does not include listening to or observing another student who is acting as the teacher's assistant or is performing a demonstration for the teacher. The student who receives ideas from another student may or may not have initiated the interaction. He may or may not give overt indications of using the ideas or information. If he hears the idea or information or is shown something which the other student has done, then his behavior falls into Category 7. The "L" versus "N" decision depends, of course, on the kind of information or ideas which he is receiving and on the lesson for the day.

Category 8. A Category 8 behavior must be preceded by a Category 7 behavior. The student who copies what he observed another student doing or who follows the instructions of another student is exhibiting Category 8 behavior. (The student who copies the behavior or follows the instructions of a student who is acting as a demonstrator for the teacher is exhibiting Category 2 behaviors.)

Category 9. These behaviors are the "reverse" of Category 7 behaviors. The student who voluntarily (or at the request of a fellow student) gives information to another student is exhibiting Category 9 behaviors. Obviously, if that information or idea is related to the lesson, then the behavior falls into "L9". (The student who gives ideas to another student at the request of the teacher is exhibiting Category 2 behavior.) The first-grade child who says, "Oh, let's put the squares and the circles together," is probably exhibiting Category 9 behavior. If the lesson involves classification, then her behavior is L9. The sixth-grader who suggests to her neighbor that they stop at the record store on the way home is exhibiting N9 behavior (probably immediately following N6 behavior). Category 9 behavior is frequently preceded by Category 6 behavior.

Category 0. Any behaviors which the observer cannot place in the above categories fall into the "0" category. If the child under observation leaves the room or is obscured from the observer's view, Category 0 is employed. This category will also be used if the observer cannot determine if the behavior is lesson related or non-lesson related.

2. Teacher Behaviors

On Page 8 is an outline of SCAS Classroom Interaction Categories for Teacher Behaviors. Note that teacher behaviors fall into two major categories: (1) interaction with less than seven children and (2) interaction with more than six children. It should be noted that the teacher behavior falls into the "more than six children" category even if the teacher is talking with only one child if she is using that child as an assistant or as a demonstrator for more than six children. The effect of the interaction should be considered in making the decision between "less than seven children" and "more than six children" category. If the teacher's spoken word is heard by more than six children, the latter category is selected.

Category 1. These behaviors include those behaviors for which there is evidence that the teacher neither visually observes the student nor listens to his verbal behavior. The behaviors which fall into Category 1 obviously involve neither interaction with a small group of children or with a large group of children. Therefore, the decision with regard to "S" or "T" behavior is determined by the previously categorized behavior. If the teacher has been interacting with less than seven children, then Category 1 behavior is recorded as S1. If the teacher has been interacting with more than six children, then her Category 1 behavior is recorded as T1.

Category 2. These behaviors include those in which the teacher appears to watch and/or listen to the student but for which there is no indication of verbal or non-verbal response to the student.

Category 3. These behaviors include any indication on the part of the teacher that he accepts and/or encourages any student behavior. Acceptance includes nodding, saying "okay" or "yes", repeating the student's statement, etc. A smile in response to a student behavior is an indication of acceptance or encouragement.

Category 4. Suggestions of alternatives for student behaviors fall into this category. These behaviors might follow acceptance or rejection of student behaviors. The teacher who says, "That's very good, but can you think of another way of doing it?" has exhibited in quick succession Category 3 and Category 4 behaviors. Of course, if she exhibited these behaviors for a group of less than seven children (or an individual child) the behavior would be recorded as S3 followed by S4.

Category 5. Rejection or discouraging a student's behavior is the "opposite" of Category 3 behaviors. The teacher who indicates that a child's response to a question is incorrect is rejecting and/or discouraging that student behavior. The teacher who shakes her head "no" is rejecting or discouraging a student behavior. Category 5 behaviors are frequently followed by Category 4 behaviors. The teacher who says, "No, Johnny, I think you can find a better way of doing that," is exhibiting Category 5 behavior followed quickly by Category 4 behavior. If she directs this comment to Johnny in such a way that it is not heard or does not influence the behavior of more than six children, then her behaviors would be recorded as S5 followed by S4.

Category 6. The very severe rejections and dramatic discouragements of student behaviors are reserved for Category 6. These behaviors include reprimands which include an element of unpleasantness for the child. Criticizing, ridiculing, and using sarcasm fall into Category 6. These behaviors are usually intended to immediately terminate some student behavior. The teacher who says very loudly, "I will not have you leaving your seats without permission," is probably exhibiting a T6 behavior. She intends for that behavior to cease immediately. The teacher who complains, "I hate to have to continue to remind you . . ." is exhibiting Category 6 behavior. Unpleasant justifications of teacher authority fall into Category 6.

Category 7. If the teacher asks questions which she expects to be answered by a student the behavior is coded by "7". This also includes a statement which is grammatically not a question but has the effect of a question. For example, the teacher statement which starts out, "Tell me what you know about . . ." falls into Category 7 even though the statement is not grammatically a question. If the request is for the purpose of finding out what the student knows or can do, then it is probably a Category 7 behavior rather than a Category 9 behavior.

Category 8. "Showing and telling" in a way which communicates information to students is a Category 8 behavior. This category also includes identification of activities that the teacher wishes to have the students do. If the teacher says, "Find out what you can about pendulums," but does not describe how it is to be done, the behavior falls into Category 8. This category also includes rhetorical questions.

Category 9. Information from the teacher which tells the students how an activity should be done meets the requirements of Category 9. This category includes behaviors which are more restrictive to student behaviors than are Category 8 teacher behaviors. Giving directions to students which severely limit their participation falls into Category 9. These behaviors are not necessarily in the form of directions to students but might be information which may be interpreted as directions by the student. For example, the teacher who identifies the properties of objects which will subsequently be classified is considered to be giving directions with regard to how children should classify the objects. Frequent difficulties in differentiating between Category 8 and Category 9 behaviors are encountered; a "ground rule" will facilitate these decisions.

Category 0. The "miscellaneous" category for teacher behaviors includes those which the observer cannot place in the above described nine categories. This might include verbal interaction which the observer cannot understand or it might include short intervals during which the teacher cannot be observed. An important caution relates to Category 1. If the teacher leaves the classroom, this behavior goes into Category 1 even though the observer is not observing the teacher.

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